American Glaucoma Society Position Statement: Marijuana and the Treatment of Glaucoma

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Glaucoma is a disease of the optic nerve that can result in vision loss and blindness. Although many factors, some only partially understood, contribute to the optic nerve damage in glaucoma patients, it has been definitively established that the level of intraocular pressure (IOP) is related to the presence of damage,[1] and that treatments that lower IOP reduce the risk of developing initial damage,[2] and slow the progression of preexisting damage.[3] Therefore, the mainstay of treatment for glaucoma patients is lowering the IOP.

There are 3 modalities in widespread use for the lowering of IOP: medications, laser treatment, and operating room surgery. Although historically, systemic medications in the form of oral carbonic anhydrase inhibitors had an important long-term role in lowering the IOP, their side effects have resulted in their almost total replacement by many classes of effective eye drops with many fewer side effects.

Despite the treatments available for lowering the IOP, there are some individuals for whom these treatments are either not tolerated due to side effects or in whom the IOP is not sufficiently lowered. In these situations, both glaucoma patient and physician look for alternative therapies.

One of the commonly discussed alternatives for the treatment of glaucoma by lowering IOP is the smoking of marijuana. It has been definitively demonstrated, and widely appreciated, that smoking marijuana lowers IOP in both normal individuals and in those with glaucoma, and therefore might be a treatment for glaucoma.[4,5] Less often appreciated is marijuana's short duration of action (only 3 to 4 h), meaning that to lower the IOP around the clock it would have to be smoked every 3 hours. Furthermore, marijuana's mood-altering effects would prevent the patient who is using it from driving, operating heavy machinery, and functioning at maximum mental capacity. Marijuana cigarettes also contain hundreds of compounds that damage the lungs, and the deleterious effect of chronic, frequent use of marijuana upon the brain is also well established.[5]

Other means of administering the active ingredient of marijuana, tetrahydrocannabinol (THC), include oral, sublingual, and eye drop instillation. The first 2 avoid the deleterious effect of marijuana smoke on the lungs, but are limited by the other systemic side-effects. In one study in which doctors offered some of their patients with worsening glaucoma the option of pills containing THC and/or smoking marijuana, 9 of 9 patients had discontinued use by either or both methods within 9 months due to side effects.[6] Given that glaucoma is a lifelong disease, commonly requiring treatment for decades, these results strongly suggest that systemic use of THC is not a reasonable treatment option for such patients. The use of eye drops containing THC, or related compounds, has been investigated, but it has not yet been possible to formulate an eye drop that is able to introduce the drug into the eye in sufficient concentrations due to the low water solubility of the active ingredients.

Although marijuana does lower the IOP temporarily, IOP lowering is only one consideration in slowing the optic nerve damage of glaucoma. For instance, there is a growing body of evidence that inadequate blood supply to the optic nerve may contribute to glaucoma damage. As marijuana given systemically is known to lower blood pressure, it is possible that such an effect could be deleterious to the optic nerve in glaucoma, possibly reducing or eliminating whatever beneficial effect that is conferred by lowering IOP. For this reason, marijuana, or its components administered systemically, cannot be recommended without a long-term trial which evaluates the health of the optic nerve.[7]

An exciting finding in the past decade is the discovery of receptors for the active components of marijuana in the tissues of the eye itself, suggesting that local administration has the possibility of being effective.[8] Furthermore, there is evidence from research in the brain that there may be properties of the cannabinoid components of marijuana that protect nerve cells like those in the optic nerve.[9] This raises the hope that marijuana or related compounds

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